

Extra practice questions.

1. A firm has the flg capital structure and after tax cost for different sources of funds used:

Sources of funds	Amount(₹)	After tax cost.
Debt	15,00,000	5%.
Pref. shares	12,00,000	10%.
Eq. shares	18,00,000	12%.
Retained earnings	15,00,000	11%.

You are required to compute weighted Average cost of capital (WACC).

⇒ Calculation of WACC

Sources of funds	Amt(₹)	After tax cost(x)	Weights (w)	Xw
Debt	15,00,000	5%.	25	125
Pref. shares	12,00,000	10%.	20	200
Eq. shares	18,00,000	12%.	30	360
Retained Earnings	15,00,000	11%.	25	275
Total	60,00,000		100	960

$$\therefore WACC = \frac{960}{100} = 9.6\%$$

2. The flg is the capital structure and the firms expected after tax component cost of the various source of finance.

Sources	Amt(₹)	After tax cost(%)
Eq. shares	6,50,000	20
Retained earnings	2,50,000	20
Pref. shares	1,50,000	15
Debt capital	4,50,000	12

You are required to Calculate the WACC.

⇒ Calculation of WACC

Sources	Amt(₹)	After tax Cost(%) (x)	Weights (w)	Xw
Eq. shares	6,50,000	20	43.33	866.6
Retained Earnings	2,50,000	20	16.67	333.4
Pref. shares	1,50,000	15	10	150
Debt capital	4,50,000	12	30	360
Total	15,00,000		100	1710

$$\therefore WACC = \frac{1710}{100} = 17.1\%$$

0. Following is the capital structure of a company

Eq. capital	4,00,000
10% Pref. share capital	2,00,000
Retained Earnings	1,00,000
5% Debentures	3,00,000

Additional info.:-

a) cost of equity is 15%

b) Retained earnings is 8%

Calculate the WACC

(Assume tax rate is 50%)

=> working note

$$\text{Cost of debt } (K_d) = \frac{I}{NP} (1 - t) = \frac{15,000}{3,00,000} (1 - 0.5) = 2.5\%$$

$$I = 3,00,000 \times 5\% = 15,000$$

Calculation of Weighted Average cost of Capital

Sources	Amt (₹)	Cost (x)	w	xw
Eq. capital	4,00,000	15%	40	600
10% Pref. share capital	2,00,000	10%	20	200
Retained Earnings	1,00,000	8%	10	80
5% Debentures	3,00,000	(WN) 2.5%	30	75
Total	10,00,000		100	955

$$\therefore WACC = \frac{955}{100}$$

$$= 9.55\%$$

The flg info. is available from the Balance sheet of a company

Eq. share capital - 20,000 sh of ₹ 10 each ₹ 2,00,000

Reserves & surplus

3% Debentures

₹ 1,30,000

₹ 1,70,000

The rate of tax is 50%

Current level of Eq. dividend is 12%

Calculate the WACC

> working note

$$\text{Cost of debt } (K_d) = \frac{I}{NP} (1 - t) = \frac{13,600}{1,70,000} (1 - 0.5) = 4\%$$

$$I = 1,70,000 \times 8\% = 13,600$$

Calculation of Weighted Average cost of Capital

Sources	Amt (₹)	Cost (x)	Weights (w)	xw
Eq. share capital	2,00,000	12%	40	480
Reserves & Surplus	1,30,000	12%	26	312
3% Debentures	1,70,000	4%	34	136
Total	5,00,000		100	928

$$WACC = \frac{928}{100}$$

$$= 9.28\%$$

5. In considering the most desirable capital structure for a co. the flg estimates of debt & equity capital have been made at various levels of debt equity mix.

Debt as % of total Capital employed	0	10	20	30	40	50	60
Cost of debt (%)	5	5	5	5.5	6	6.5	7
Cost of equity (%)	12	12	12.5	13	14	16	20

You are required to determine the optimal debt-Equity mix of the co. by Calculating cost of capital.

⇒ Calculation of Composite Cost of Capital

Capital Employed		Cost of debt (%)	Cost of Equity (%)	WACC = Debt + Equity
Debt	Equity			
0	100	5	12	$0 + 12 = 12\%$
10	90	5	12	$0.5 + 10.8 = 11.3\%$
20	80	5	12.5	$1 + 10 = 11\%$
30	70	5.5	13	$1.65 + 9.1 = 10.75\%$
40	60	6	14	$2.4 + 8.4 = 10.8\%$
50	50	6.5	16	$3.25 + 8 = 11.25\%$
60	40	7	20	$4.2 + 8 = 12.2\%$

The optimal debt Equity mix of the co. is debt of 30% and Equity of 70% of total capital employed which gives minimum composite cost of capital.

6. XYZ Ltd is planning for the most desirable capital structure. The cost of debt (after tax) & equity capital at various levels of debt-equity mix are estimated as follows:-

Debt as % of total Capital employed	0	20	40	50	60
Cost of debt (%)	10	10	12	13	14
Cost of equity (%)	15	15	16	18	20

Determine the composite cost of capital for each level of debt. Identify the optimum debt-equity mix.

⇒ Calculation of Composite cost of Capital

Capital Employed		Cost of debt (K_d) (%)	K_e (%)	WACC = $K_d + K_e$
Debt	Equity			
0	100	10	15	$0 + 15 = 15\%$
20	80	10	15	$2 + 12 = 14\%$
40	60	12	16	$4.8 + 9.6 = 14.4\%$
50	50	13	18	$6.5 + 9 = 15.5\%$
60	40	14	20	$8.4 + 8 = 16.4\%$

7. A company has on its books the fig^s amounts and specific costs of each type of capital

Type of capital	Book value (£)	Market Value (£)	Specific cost(%)
Debt	4,00,000	3,80,000	5
Preference	1,00,000	1,10,000	8
Equity	6,00,000	12,00,000	15
Retained Earnings	2,00,000	-	13

Determine the WACC using:-

a) Book value weights and b) Market value weights

How are they differing? Can you think of a situation where the WACC would be the same using either of the weights?

⇒ a) Determination of WACC (Book value weights)

Sources	Amt (£)	cost(x)	(w)	xw
Debt	4,00,000	5	30.77	153.85
Pref.	1,00,000	8	7.69	61.52
Equity	6,00,000	15	46.15	692.25
Retained Earnings	2,00,000	13	15.38	199.94
Total	13,00,000		100	1107.56

$$WACC = \frac{1107.56}{100} = 11.07\%$$

b) Determination of WACC (Market value weights)

Sources	Amt (£)	(x)	(w)	(xw)
Debt	3,80,000	5	22.49	112.45
Pref.	1,10,000	8	6.51	52.08
Equity	12,00,000	15	71	1065
Retained Earnings	-	13	-	-
Total	16,90,000		100	1229.53

$$WACC = \frac{1229.53}{100} = 12.29\%$$

How are they differing?

The WACC calculated using BV weights and MV weights differ because the weights are based on different values. BV reflects the historical cost of capital, while MV reflects the current market perception of the company's capital structure. MV tends to fluctuate more than BV.

Situation for same WACC.

- The market values of the company's debt, pref. shares & equity are exactly equal to their BV. This is a rare occurrence, as MV tends to fluctuate based on investor sentiment & market conditions.
- The company's capital structure remains stable & cost of capital does not change over time.

8. Following is the details regarding the capital structure of S co.

Type of Capital	Book value (₹)	Market value (₹)	Specific cost (%)
Debenture	40,000	38,000	5
Pref. capital	10,000	11,000	8
Equity capital	60,000	1,20,000	13
Retained Earnings	20,000	-	9

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You are required to determine the WACC:-

a) Based on BV as weights & b) Based on MV as weights.

⇒ a) Determination of WACC (BV)

Sources	Amt (₹)	(X)	(W)	XW
Debenture	40,000	5	30.77	153.85
Pref.	10,000	8	7.69	61.52
Equity	60,000	13	46.15	692.25
Retained Earnings	20,000	9	15.38	199.94
Total	1,30,000		100	1107.56

WACC = $\frac{1107.56}{100} = 11.07\%$

b) Determination of WACC (MV)

Sources	Amt (₹)	(X)	(W)	XW
Deb	38,000	5	22.49	112.45
Pref.	11,000	8	6.51	52.08
Equity	1,20,000	13	71	1065
Total	1,69,000		100	1229.53

WACC = $\frac{1229.53}{100} = 12.29\%$

9. X co. Ltd has the following capital structure

Eq. share capital (2,00,000 shares)	40,00,000
6% pref. shares	10,00,000
8% Debentures	30,00,000

The market price of company's R.S is ₹20. It is expected that the company will pay a current dividend of ₹2/sh. which will grow @ 7% forever. The tax rate may be presumed at 40%.

You are required to compute the following:

- WACC based on existing capital structure
- The new WACC if the company raises an additional of ₹20,00,000 debt by using 10% Debentures. This would increase the expected dividend to ₹3 and leave the growth rate unchanged but the price of share will fall to ₹15/sh.
- The cost of capital if in (b) above growth rate increase to 10%.

⇒ Working Note.

$$\text{Cost of Equity (K}_e\text{)} = \frac{D_1}{MP} + g = \frac{2}{20} + 0.07 = 0.17 \text{ (or) } 17\%$$

$$\text{Cost of pref. (K}_p\text{)} = \frac{D}{NP} = \frac{60,000}{10,00,000} = 0.06 \text{ (or) } 6\%$$

$$\text{Cost of debt (K}_d\text{)} = \frac{I}{NP} (1-t) = \frac{2,40,000}{30,00,000} (1-0.4) = 0.048 \text{ (or) } 4.8\%$$

a) Calculation of WACC

Sources	Amt(₹)	Cost(x)	(w)	xw
Eq. share	40,00,000	17	50	850
Pref. share	10,00,000	6	12.5	75
Debentures	30,00,000	4.8	37.5	180
Total	80,00,000		100	1105

$$\text{WACC} = \frac{1105}{100} = 11.05\%$$

b) Calculation of new WACC

Sources	Amt(₹)	Cost(x)	(w)	(xw)
Eq. share	40,00,000	27	40	1080
Pref. share	10,00,000	6	10	60
Debentures	30,00,000	4.8	30	144
10% Deb.	20,00,000	6	20	120
Total	1,00,00,000		100	1404

$$\text{WACC} = \frac{1404}{100} = 14.04\%$$

$$\text{Cost of debt (K}_d\text{)} = \frac{I}{NP} (1-t) = \frac{2,00,000}{20,00,000} (1-0.4) = 0.06 \text{ (or) } 6\%$$

$$\text{Cost of Equity (K}_e\text{)} = \frac{D_1}{MP} + g = \frac{3}{15} + 0.07 = 0.27 \text{ (or) } 27\%$$

c) Calculation of WACC when growth rate increases.

Sources	Amt(₹)	Cost(x)	w	xw
Eq. share	40,00,000	30	40	1200
Pref. share	10,00,000	6	10	60
Debentures	30,00,000	4.8	30	144
10% Deb.	20,00,000	6	20	120
Total	1,00,00,000		100	1524

$$\text{WACC} = \frac{1524}{100} = 15.24\%$$

$$\text{Cost of equity (K}_e\text{)} = \frac{D_1}{MP} + g = \frac{3}{15} + 0.1 = 0.3 \text{ (or) } 30\%$$

10. The capital structure of Hindustan Traders Ltd is as follows: as on 31/3/1999

Eq. share : 100 Lakh eq. share of ₹10 each	₹ 10cr
Reserves	₹ 2cr
14% Deb of ₹100 each	₹ 3cr

The co. has paid Eq. dividend @ 20%. As the company is a market leader with good future, dividend is likely to grow by 5% every year. The Eq. shares are now traded at ₹80 per share in the stock exchange. Income tax rate to the co. is 50%.

Required:

a) The current WACC

b) The co. has plans to raise a further ₹ 5cr by way of long term loan at 16% interest. When this takes place the market value of the company eq. share is expected to fall to ₹ 50/sh. What will be the new WACC of the company?

⇒ a) Calculation of current WACC

Sources	Am't (₹)	Cost (%)	w	xw
Eq. capital	10cr	7.63	66.67	508.69
Reserves	2cr	7.63	13.33	101.71
14% Deb	3cr	7	20	140
Total	15cr		100	750.4

$$K_e = \frac{D_0(1+g)}{MP} + g$$

$$K_e = \frac{D_0(1+g)}{P} + g$$

$$= \frac{2(1+0.05)}{80} + 0.05$$

$$= 0.07625 (or) 7.63\%$$

$$K_d = \frac{I}{NP} (1-t) = \frac{42,00,000}{3,00,00,000} (1-0.5) = 0.07 (or) 7\%$$

$$WACC = \frac{750.4}{100} = 7.504\%$$

b) Calculation of new capital structure of WACC

Sources	Am't (₹)	Cost (%)	(x) Cost	xw
Eq. capital	10cr	50%	9.2%	460
Reserves	2cr	10%	9.2%	92
14% Deb	3cr	15%	7%	105
16% Deb	5cr	25%	8%	200
Total	20cr	100		857

$$K_e = \frac{D_0(1+g)}{P} + g$$

$$= \frac{2(1+0.05)}{50} + 0.05$$

$$= 0.092 (or) 9.2\%$$

$$K_d = \frac{I}{NP} (1-t)$$

$$= \frac{20,00,000}{5,00,00,000} (1-0.5)$$

$$= 0.08 (or) 8\%$$

$$WACC = \frac{857}{100} = 8.57\%$$

Given below is the summary of the balance sheet of the company as at 31/3/2012

Liabilities	Amt (£)	Assets	Amt (£)
<u>Eq. share capital</u> 20,000 sh of £10 each	2,00,000	Fixed Assets	4,00,000
Reserves & surplus	1,30,000	Investments	50,000
8% Debentures	1,70,000	Current assets	2,00,000
<u>Current Liabilities</u>			
Short term loans	1,00,000		
Trade creditors	50,000		
	6,50,000		6,50,000

You are required to calculate the company's WACC using balance sheet valuation. The following additional info. is also available.

- 8% Deb. were issued @ par
- All interest payment is upto date & equity dividend is currently 12%.
- Short term loan carries interest @ 18% p.a.
- The shares & Debentures of the co. are all quoted on the stock exchange are current Market price are as follows:
K.S. £14 each, 8% Deb. £38 each
- The rate of tax for the co. may be taken @ 50%.

⇒ Calculation of Book value per share

20,000 shares of £10 each	2,00,000
Reserves & Surplus	1,30,000
<u>Total</u>	<u>3,30,000</u>

$$\text{Book Value per share} = \frac{3,30,000}{20,000} = 16.5$$

$$K_e = \frac{D_1}{P_0} = \frac{1.2}{16.5} = 0.0727 \text{ (or) } 7.27\%$$

$$MV/sh = \frac{4,10,000}{20,000} = 20.5$$

$$K_e = 5.85\%$$

$$K_d = 4\%$$

$$K_d = \frac{I}{NP} (1-t) = \frac{13,600}{1,70,000} (1-0.5) = 0.04 \text{ (or) } 4\%$$

Calculation of current WACC

Sources	Amt (£)	Cost (%)	w	xw
Eq-sh capital	3,30,000	7.27	66	479.82
8% Deb.	1,70,000	4	34	136
<u>Total</u>	<u>5,00,000</u>		<u>100</u>	<u>615.82</u>

$$WACC = \frac{615.82}{100} = 6.158\%$$

Calculation of market WACC

Amt (£)	Cost (%)	w	xw
4,10,000	5.85	71.11	415.99
1,66,600	4	28.90	115.6
<u>5,76,600</u>		<u>100.01</u>	<u>531.59</u>

$$WACC = \frac{531.59}{100.01} = 5.315\%$$

12. The fig is the capital structure of Saras Ltd as on 31/12/2005.

Particulars	Amt (₹)
Eq. share - 20,000 shares of ₹100 each	20,00,000
10% p.s of ₹100 each	8,00,000
12% Debentures	12,00,000

The market price of the company's share is ₹110 and it is expected that a dividend of ₹10/share would be declared after 1 year, the dividend growth rate is 6%.

- a) If the company is in the 50% tax bracket, compute the WACC
 b) Assuming that in order to finance an expansion plan, the co. intends to borrow a fund of ₹20 Lakhs bearing 14% rate of interest, what will be the company's revised WACC? This financing decision is expected to increase dividend from ₹10 to ₹12/share. However, the market price of Eq-share is expected to decline from ₹110 to ₹105/share.

⇒ a) Computation of WACC

Sources	Amt (₹)	Cost (r)	W	XW
Eq. share	20,00,000	15.09%	50	754.5
10% pref. share	8,00,000	10%	20	200
12% Deb.	12,00,000	6%	30	180
Total	40,00,000		100	1134.5

$$WACC = \frac{1134.5}{100} = 11.34\%$$

$$K_e = \frac{D_1}{NP} + g = \frac{10}{110} + 0.06 = 15.09\%$$

$$K_p = \frac{PD}{NP} = \frac{80,000}{8,00,000} = 10\%$$

$$K_d = \frac{I}{NP} (1-t) = \frac{1,44,000}{12,00,000} (1-0.5) = 6\%$$

b) Computation of new WACC

Sources	Amt (₹)	Cost (r)	W	XW
Eq. shares	20,00,000	17.43	33.33	580.94
10% pref. share	8,00,000	10	13.33	133.3
12% Deb.	12,00,000	6	20	120
14% Deb.	20,00,000	7	33.33	233.31
Total	60,00,000		100	1067.55

$$WACC = \frac{1067.55}{100} = 10.67\%$$

$$K_e = \frac{D_1}{NP} + g = \frac{12}{105} + 0.06 = 17.43\%$$

$$K_d = \frac{I}{NP} (1-t) = \frac{2,80,000}{20,00,000} (1-0.5) = 7\%$$